



METHOD AND APPARATUS FOR EVALUATING SOFT MATERIAL PROPERTIES USING NONLINEAR VIBRATIONS

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Overview

Characterizing the mechanical properties of multiphasic materials can be important in many applications. In the food industry, for instance, such characterization can help evaluate dehydration and aid in the processing of vegetables and fruits. In the biomedical industry, characterizing the mechanical properties of multiphasic materials can help distinguish healthy tissue from cancerous tissues as well as evaluate the malignancy of cancerous tissues. Real-time monitoring of the mechanical properties of multiphasic materials can also help to understand and predict the growth and fate of the engineered tissues. In robotic and sensing applications, such monitoring can be used to assess degradation of elastomers over time or to investigate the operation of multiphasic materials having magnetic or ionic phases for adaptive reshaping of actuators or the production of flexible electronics.

The Invention

UW Madison Researchers have developed a novel system using both linear and non-linear vibrations to make measurements of soft materials. In particular, by using nonlinear vibration response of soft multiphasic materials they can identify elastic moduli, internal stresses, and geometry. Information beyond Young's modulus can be obtained through vibration measurements by inducing vibrations in a nonlinear response regime. This additional information can include the thickness of the sample and internal stresses in the sample that would occur in the static state. This additional information has value in its own right but can also help improve the accuracy of the measurement of Young's modulus.

Additional Information

For More Information About the Inventors

- [Melih Eriten](#)

Tech Fields

- [Analytical Instrumentation, Methods & Materials : Sensors](#)

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